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THE
June 1939

STATE DOCUMENTS

CENTER LINE

VOL. 2 NO. 4

JUNE 1939



HEADQUARTERS
NUMBER



OFFICIALS OF THE
CHANDLER

HEY! DON'T READ THIS PAGE

The annual dinner dance of the Highway Department will be held June 17th at Helena, in the Civic Center Ball Room. All employees of the Highway Department and the Highway Patrol are invited to attend. In fact if any are within reasonable distance of this scintillating session and fail to appear, dire things are apt to happen to them that in comparison will make the Cypsy curse seem like winning the Irish Sweepstakes.

The cocktail hour starts promptly at 7 bells and substantial comestibles will weight the boards when the subtle oil has thoroughly penetrated loosening up dour intraverts and lubricating the rusty wisecracks of the aged.

Inasmuch as 1939 marks the Golden Anniversary of Montana's statehood most of the residents of God's Country, including a few sequestered areas that God forgot, are growing luxuriant chin crops running at least ten field mice and a meadow lark to the acre. All such stalwart gents are more than welcome while the baby-faced adolescents will have to slink by the gate keeper in shame.

In keeping with the spirit of the times EVERYONE attending this gorgeous, gala and gargantuan gastronomic occasion is expected to, nay, absolutely REQUIRED to present themselves in old fashioned or cow country raiment. No excuses can soften the flint-hearted watch dogs at the portals. No cajolery will melt their steely fronts. Either come in costume or stay at home.

As first prize to the best dressed single gal will be given a gorgeous Gruen. The best dressed matron will receive a beautiful cluster of sour grapes. The best dressed single stag and mated buck will each receive appropriate prizes.

The General Committee hereby exposes a hole card that should draw like a porous plaster - viz- no speeches, good, serious, funny or painful will be tolerated. If anyone must become the cynosure of all eyes, let him buy a drink for the house. One will get him twenty.

Just what will be the ante for the ducats is still a mystery unsolved as yet, even by the committee, but it will probably be in the neighborhood of two fish per plate. All employees, especially those residing away from head quarters, are urged to immediately signify their intentions of being present by so writing The Banquet Committee, c/o Bituminous Division, State Highway Department, Helena, indicating how many reservations they wish made.

This will be no trivial, down-at-the-heel, back door handout. It will be a bust that will reverberate down the corridors of time. Tie on your hats and come to town!

In case you want to see somebody about 'somethin', the committees are listed on the following page.

COMMITTEES FOR 1939 HIGHWAY PARTY

General Committee

Roy Cheney

Bob Fletcher

Jimmy Higgins

Illumination:

Art Zion, Sub-chairman
Max Folsom
Jerry Ross

Roadside Development:

Johnny Morrison, Sub-chairman
Tommy Robertson
Reese Humphrey
Pat Martin
Charlie Horen
Don McGarry
"Casey" Allison
Art Moren

Construction:

Carl Berggren, Sub-chairman
Oscar Hovde
Bill Barker

Signing & Striping:

Ace Kendrick, Sub-chairman
Shorty Shope

Beautification:

Hank Helland, Sub-chairman
Charley Bruce
Bill Fredricks
Bill Bawden
Norm Hatch
Charley Shelton
Lyall House

Skilled Labor:

Bill Ashton, Sub-chairman
Harry Fuller
Al Greiner
Art Lalime
John Flanagan
Kady Dalton
O. J. Jawort
Morris Griffith

Location:

Guy Richardson, Sub-chairman
George Bennett

Ciling:

Horace Williams, Sub-chairman
Carl Johnson
Guy Johnson
Ross Pollock
Fred Ratche
Malcolm Bowden
Clarence Decker
Si Patterson
Harold Carret
Hack Nelson
Charles King
Eddie Atchison

Certified Check:

Slick Fleherty, Sub-chairman
Eve Kraft
Leo Schucknecht
Bob Munzenrider
Tony Zugel

Scenic & Wildlife:

Ralph Huntington
Lytle Strong

Port of Entry:

Ann Lynch, Sub-chairman
Mary Morris
Florence Reeser
Peg O'Grady
Elizabeth Baldwin

Clearing & Grubbing:

Dale Lince, Sub-chairman
Duck Gough
Johnny Fenn
Gordon Hayman
Frank Cunningham
Louis Scofield
Ed Word
Chet Coleman
Harry Good
John Crowley

Mr. D. L. Cheney, Chairman
Highway Party Committee
Helena, Montana

Busby, Montana
May 22, 1939

Dear Mr. Cheney:

I want to apologize first for imposing on you, but after you read my letter you can see why I feel compelled to call for help.

Our job here at Busby is not very well located for a fellow looking for a date to a big dance. The few girls around here are all nice looking, but my grandpa nearly lost his scalp 70 years ago, and my family have all been kind of shy about meeting these people since.

Now I hate to come right out and ask you to get me a date for this highway party, but I don't know any Helena girls and I don't want to come all that way to just sit around by myself like I did last time. I have only been a R.A.S.I. for 2 years so I still have a good suit of clothes and a clean shirt, and while I can't do any of the dances they do down here I can do pretty well on a waxed floor.

So please, Mr. Cheney, help me out of my trouble as I really do want to get a nice girl to take to the party.

Hoping for an early reply, I am

Anxiously yours,

(Signed) Rod. N. Picket
Busby, Montana

Mr. Rod N. Picket
Montana Highway Department
Busby, Montana

Helena, Montana
May 24, 1939

Dear Mr. Picket:

Your letter of May 22 has just come to my attention and I was, to say the least, deeply touched by the predicament you are in.

As I am a man with a wife and two children, any direct effort on my part to help solve your problem might be misinterpreted, but since others may be affected in the same manner you are, I appealed to the editor of Center Line. That worthy gentleman was also impressed and saddened by your lonely condition and assured me that, although space would not permit a full and complete list, he would be glad to introduce you through the pages of his publication to a few of our lively and glamorous typewriter wreckers here in Helena who are unattached.

Sincerely yours,

D. L. Cheney
Chairman, Highway Party Committee

M E E T

all you attached and unattached, a few of our Typewriter Wreckers who have been neglected on this page in the past. First,--

ELIZABETH ANNE BALDWIN, The girl who occupies the "Chief's" reception room. She is single, unattached, curly brunette, age just right. Baldy is a native daughter of the glorious State of the Golden West where it never rains except it pours and you see the sun every day except when it's foggy and misty. She has lived down her birthright and is now a good Montana Outdoor Girl. She tried a year at Stanford U but soon returned to again seek employment with us; that was in 1936; since then the pitfalls of matrimony have been successfully evaded and her major loves are skiing in the winter and swimming and tennis in the summer, and her favorite indoor sport is reading during office hours. By the way, height, 5'5", weight 125, disposition sunny, dancing ability 100%. Prefers Scotch and soda.

EVE MAY KRAFT. Punch machine operator, Planning Survey. Eve shook the dust of Karlsruhe, North Dakota, where she was born, from her slippers and came to Montana some years ago, and took up her abode in the Electric City. She attended the Great Falls Business College, worked for the Tribune for two years and the Department of Agriculture one year, then felt the urge to see the world and got as far as Helena. Has been here ever since, first with the P.W.A. for 1 1/2 years and since 1937 with the Highway. Eve makes no claim to be a lover of the outdoor life--winter recreation is parties and dancing and summer sports mainly include picnics and more dancing. Statistics include -- single (semi-unattached), semi-blonde, age of reason, height 5'4", weight 116 (watch the swift guy in the Swift car). The Exchange Club is her unofficial guardian on account of her success as a seller of tickets. Prefers straight Bourbon.

MARY VINA MORRIS, the girl who types the letters in the Bituminous Division. Mary is a native product, giving Baker, Montana, as her place of birth. Of legal age, this sunny, even-dispositioned brunette always has a smile and a comeback for all wise cracks (ask Kivley and Leary). Mary journeyed to Billings and matriculated from the Business College there before tackling the world to rattle a living from same. Mary has taken up golf in a serious way for a summer past time and says that when young, she was blest with very keen hearing so she knows all the words, but this is the first opportunity she has ever had to use them, and use them she does, according to all reliable accounts. Before coming to work for us, Mary worked in the Treasurer's office in Baker, then kept books in a theater where she became an authority on actors and actresses, their lives and vices. Here is another girl who in the winter time takes to the hills and coasts up and down dale on curly bed slats. Last, but not least, -- height, 5'3", weight 107, shakes a wicked foot and prefers gin and bitters.

CATHERINE MARY MCCARTHY, Accounting Division, has been known to answer (with dirty looks) to "Chubby". This transplanted bit of old Erin was born in the Smelter City, and has voted at a Presidential Election. She graduated from Anaconda Hi and attended Helena Business College. Neither place was burned to get her out. This girl is semi-attached, making weekend visits to Anaconda to see her "family". Kay was cashier and usher in a theater and gave the Owsley Drug Firm a hand before joining the Highway in 1938. This dame is high-minded, flying being one of her hobbies in good weather, and a rider of the greased boards in the bad weather. Lest we forget, natural curly brunette, height 5-4½", weight 112, prefers Scotch and Soda, and will dance from dusk to dawn.

FLORENCE ELLEN REESER hails from the State where the tall corn grows, Iowa. She wrecks the Remington in the Bridge Division when not knitting, Florence having the reputation and the goods to prove it of throwing more yarn into dresses than any other good looking blonde in this fair city. Before migrating to Montana and becoming acclimated, she attended Drake University, then worked in a Bank, gave the Post Office business a looking over, and tried her hand with the Telephone Company in Butte. The Music Business had her agog for a while, but she forsook all these pursuits when the opportunity was offered and signed up with the Highway in June of 1931 and has been with us ever since. Florence's ability on skis is unknown, but she makes a nice looking view when decked out in all the finery and flannels the fair damsels don to enjoy this sport around a good roaring camp fire. In the summer she is an ardent golf fan and having been raised in corn and hog country, knows the lingo to use when things are going tough. Bends an elbow on the 19th hole proffering gin rickys. Also she is past the age of innocence, weighs 130 and hits the height of 5-6½", a good hoof-shaker and always ready for a joke and a laugh.

EVELYN MARY COFFEY, the short, cute red haired blonde who punches the typewriter in the Personnel Division daytimes for a diversion and entertains her friends with various parlor tricks of evenings when the occasion demands. Evelyn was dropped by the stork at Wolf Point and still claims the place as home, although she has favored Helena as her place of residence since 1933 when she worked in the House during one of their hectic sessions. The Relief Commission claimed her talents for a spell, then she heard the call and has given us a very capable hand ever since. Evelyn went east once to attend school at Saint Catharines in St. Paul and the Minnesota School of Business, but she missed the plains of eastern Montana, the smell of Buffalo chip fires around the teepees at night, and soon returned, vowed never more to roam, but the gypsy in her is hard to quell in the spring time so to quiet the urge to travel is apt to quote poetry when the feet have the itch to move. She prefers a fireplace and a book to the more robust outdoor sports in the winter time and spends the balmy summer evenings communing with nature by being an inveterate window shopper. Styles and shapes of women's hats are a taboo subject when in her company, and before closing must mention, height 5-1", weight 102(soaking wet) and can she dance and loves to too - takes her whisky straight.

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Felix says, "Sensible girls aren't as sensible as they look, or they'd have more sense than to look sensible."

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WHY FEW ARE Chosen

BY FRANK CUNNINGHAM
PERSONNEL DIVISION

You, Sir or Madame, faithful employee of the Highway Department, are one in a hundred as for every hundred applicants we have in the course of a year only one will even briefly grace our payroll.

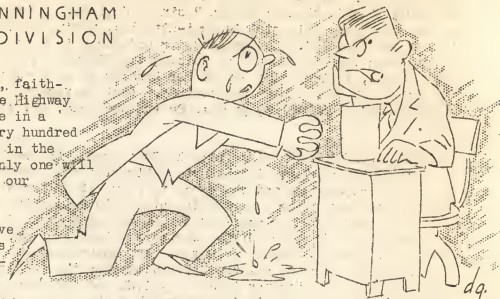
Although we now have enough applications on hand, representing every occupation from preacher

to peanut vendor, to completely populate a small city, every day more applications pour into the mail box and applicants troop through the door. Methods of applying for work would be nearly as numerous as applicants if a standard form were not in use, and even when the submission of this form is prefaced and supplemented by letters, telephone calls and personal interviews, often the essential facts are still unrevealed. Considering the fact that they are seeking a means of livelihood, the average person is guilty of gross neglect in applying for work.

When a person considers buying a machine for a definite, specific job, naturally he wants to know that it will serve his purpose. He ascertains whether someone else has previously used this machine for a similar purpose, whether he can get it when he wants it and that the price asked is not in excess of its value to him. Yet, frequently, the applicant for work fails to realize that a man for a job is more essential than a machine and apparently thinks that by some obscure mental telepathy the employer knows all the facts concerning him, just what he can do, when he is available for work, the place he can be reached and the salary he expects. To illustrate what frequently happens we will assume that a person has just received one of our application forms and is ready to fill it out.

Although his handwriting may not be legible he will seize a post office pen and attack the form with speed and vigor. Upon coming to a question that is difficult or unpleasant to answer, he inserts a check mark and considers it adequate information. Instructions, however simple, he apparently regards as a passing fancy of the printer, to be followed only as far as is convenient. In attempting to finish the unpleasant task of asking for work as soon as possible, people omit their addresses or do not give them completely, fail to even imply what work they have done before, omit references, and in more than a few cases do not even sign their names.

While many applicants fail to answer the questions asked, even more give answers that tell one nothing. When the answer to the question "Salary expected?" is "A living wage" the reaction is usually only slight curiosity as to how much it requires for that person to live; and if he replies that he will do "Anything" when asked the kind of work he wants, the applicant is immediately suspected of



being either a liar or a very unscrupulous person. Some replies take a humorous turn such as that of the man who stated his marital status was "blonde," the other who told us that his was "promising," or the one who let it be known that the reason for leaving his last position was "Mother-in-law." But the fellow who represented that the duties on a former job were "plenty" was catalogued as a crier.

Occasionally the other extreme is found, someone who knows exactly the job he wants, the salary he will accept, and where and for whom he will work. Even if such people may ask more than they can get, they are much preferred to those with only the hazy idea of working at something.

Often the employer is as much to blame for vague, indefinite replies as is the applicant, when with a little effort he could help the poor job-hunter to intelligently ask for work. He may consider it a school girl's trick to sit down and write out what his ideal man must have and, like her, will probably have to take someone who falls short of the specifications, but he will undoubtedly get better help that way than by merely asking for "a damn good hand, like Jones." Given the opportunity, the job hunter can measure his qualifications against those required and if he can see that he cannot do the work he is not likely to waste time asking for it.

This is not a lament nor a complaint for if we received applications only from qualified persons, each complete, clear and definite, we would soon tire from the strain of looking at perfection and our existence would become dull. Even the prospect of sufficient applicants to populate the country adjacent to our town would fail to cheer us. We are telling our story so that if one of you should, sometime in the future, be looking for work you may benefit in some degree from these sad mistakes of others.

Now our desk has just been decorated with a number of new applications and we must get back to work, but before we do we will offer one unsolicited suggestion. If you ever apply for work, find out in what line the person or firm whom you select is engaged and make an effort to discover the type of employee they want to hire. Then if you are sufficiently interested to carefully and intelligently reply to any questions you are asked you will find that your efforts will be well repaid. You may not be hired but you will surely be remembered as that unusual person, a job-hunter who, although he might not get a shot, at least know how to aim.

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Mr. F. E. Stanley, Assistant Chief Draftsman in the Plans Division, wants to know if there is a complaint department connected with Center Line. A representative of the Bearded Committee working with the Helena Diamond Jubilee Committee, canvassed the Highway Building signing up the boys to grow whiskers for the celebration. Sezee, upon seeing Mr. Stanley, "Well, well, you're coming right along there." Says Stanley, "Yeah, I think I'll make it." Stanley, if you don't know, has been the proud possessor of a neat Van Dyke for at least forty years, by his own claim.

He says he's had the thing for all these years and no one ever noticed; it now attracts so much attention that he's threatening to shave the darned thing off.

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P O E T R Y

Some time ago Center Line published the poem titled "The Engineer" and noted that the author was unknown. Now A. L. Seaton of the Billings division tells us that the February issue of "Roads and Streets" published a reprint of the poem, mentioning that it was gleaned from the Center Line and asking if anyone could identify the author. This prompted Mr. J.Q. Barlow of the Utah Construction Company, San Francisco, to submit the following information, which was published in the March number of R & S:

"On Page 44 of your February issue, you have quoted a poem entitled "The Engineer" and asked if someone could give you the author.

"This poem is very old. I have had a typewritten copy in my possession for possibly forty years. It was supposed to have been written by W. C. Kidd. Something like 48 or 50 years ago I was acquainted with Kidd when he was an instrumentman on one of our parties, engaged in preliminary and location surveys for the Union Pacific Railroad."

According to Mr. Seaton, this is the first authentic information he has heard concerning this verse. He further says: "C.E. Shipman can take a bow for starting this latest controversy. During the fall of 1935 "Shippy" was located in Billings and quoted this poem from memory; later he made a few typewritten copies of the same and presented me with one of them. I sent a copy to Bozeman, from where it eventually found its way to Center Line. We can thank the good memory of C. E. Shipman for reviving about the best poem of its kind extant. Does anybody in the outfit have information of interest concerning this poem?"

Hoping to dig up more information about anonymous poems, we give you on the following page "THE ENGINEERS", submitted by Bob Fletcher.

Let's hear from you in connection with this poem, or if you have in your possession copies of similar verse we will be glad to print them.

-- THE ENGINEERS --

Who is the man who views the mines
and promptly turns them down?
Who is the one that, thinks this is the
shortcut to renown?

Who is it gives the bum advice to the
innocent financier?

The knowledge-feigning, theory-
straining mining engineer

Who steals our gold and silver, and
copper, zinc and lead?

Who takes the joy all out of life and
strikes our high hopes dead?

Who never wrote a schedule that to
anyone else was clear?

The sulphur-belching, miner-welching
smelter engineer.

Who is the man designs our pumps
with judgment, skill and care?

Who is the man that builds 'em and
who keeps them in repair?

Who had to shut them down because
the valve seats disappear?

The bearing-wearing, gearing-tearing,
mechanical engineer.

Who buys his juice for half a cent and
wants to charge a dime?

Who when we've signed the contract
can't deliver half the time?

Who thinks a loss of twenty-six per
cent is nothing queer?

The volt-inducing, load-reducing elec-
trical engineer.

Who thinks without his products we
would all be in the lurch?

Who has a heathen idol which he
designates Research?

Who tints the cheeks, perfumes the air
and makes the landscape drear?

The stink-evolving, grass-dissolving
chemical engineer.

Who is the man who'll draw a plan for
everything you desire?

From a transatlantic liner to a hairpin
made of wire?

With "ifs" and "ands", "howe'ers" and
"buts" who makes his meaning clear?

The work-disdaining, fee-retaining
consulting engineer.

Who is it takes a transit out to find a
sewer to tap?

Who then with care extremes locates
the junction on the map?

Who is it goes to dig it up and finds
it nowhere near?

The mud-bespattered, torn-and-tattered
civil engineer.

Who builds a road for fifty years that
disappears in two?

Who changes his identity, so no one's
left to sue?

Who covers all the traveled roads with
filthy, oily smear?

The bump-providing, rough-on-riding
highway engineer.

Who takes the pleasure out of life
and makes existence hell?

Who'll fire a real good-looking one
because she cannot spell?

Who substitutes a dictaphone for coral-
tinted ear?

The penny-chasing, dollar-wasting
efficiency engineer.

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THE EQUIPMENT RENTAL SYSTEM

by

W. E. Bawden, Equipment Engineer

We are now nearing the end of the first year's operation of the Equipment Cost Accounting Procedure or Equipment Rental System, which was inaugurated on July 1, 1938.

A three-fold purpose prompted the installation of this procedure: First, to keep an accurate cost of operation of all equipment; Second, to keep an accurate record of the cost of maintenance of the various sections of roadway; Third, to ascertain comparison of operating costs in various division shops.

In order to keep an accurate cost of operation of equipment, detailed records must be kept of all consumable items; (such as gasoline, oil, grease, etc.,) repair parts, accessories, labor, overhead, insurance and depreciation. A yearly cost sheet for each piece of equipment is kept in the Helena Shop and records of the above are kept on these sheets. Entries are made thereon from: Operator's Daily Equipment Records, claims, payrolls and Stores Account Records. Those expenses which cannot be charged direct to a specific piece of numbered equipment, but are incidental to equipment operation and repairs, are placed in an overhead account and prorated to the various pieces of equipment at certain periods of the year. Insurance premiums covering Property Damage, Public Liability, and Fire and Theft insurance are charged to each unit as paid.

The total operation expenses, together with the fixed depreciation based on the estimated life of the equipment, constitutes the total expenses on the equipment which should be collected in the form of rental.

A lifetime record of each piece of equipment is kept in the Equipment Division of each piece of numbered equipment, which record should be a valuable source of information for future years.

In order to keep an accurate record of cost of maintaining a specific section of roadway, it was deemed advisable to place all equipment on a rental basis and charge for its use at an hourly or daily rate while working on any particular section of roadway. This eliminated the old method of prorating operating expenses on a guess basis or, in too many instances, charging repairs and overhaul expenses, sometimes amounting to a considerable sum, to the maintenance authorization or section which could best stand the charges. The rental rates on various types of equipment were fixed by anticipating the number of hours it would be in operation and dividing this into the total anticipated operating expenses, (less gasoline and oil), plus depreciation. For the first year's operation, it was necessary to anticipate these figures, however, in the future we will have concrete figures based on actual experience. A rental rate should take care of all operating expenses plus depreciation on the equipment and at the end of its anticipated life a sufficient balance should be accumulated from the rentals for the replacement of the unit.

A preliminary analysis of the first six months operations of the cost accounting procedure indicates that the rental rates are consistently low. The actual anticipated hours of operation has fallen below

the estimate and the cost of upkeep has exceeded expectations. This is attributed partially to the fact that our snow removal operations were cut to a minimum due to the light winter snowfall. The light trucks were used to some extent, however, the heavy snow removal equipment was seldom put into operation.

As of December 31, 1938, the total rentals earned covered the actual operating expenses against all equipment and part of the total depreciation. Incidentally, only a small amount has been accumulated for the purchase of new equipment. Total equipment rentals earned as of the above date totaled \$254,692.00 and total operating charges against the equipment total \$216,667.00, leaving a balance of \$38,024.85 to take care of depreciation and to go toward the purchase of new equipment.

The preliminary analysis of the first six months operation does not give us a full picture of costs on all types of equipment because certain types such as heavy snow removal equipment, trucks and snow plows, are not used as much before January 1st as they are after that date. Repairs and overhaul costs on this type of equipment has been made and charged against the equipment, however, rentals have not accrued and cost per mile and costs per hour will be excessive. When rentals are collected at a later date, unit costs will be reduced. We are listing below some information obtained through our analysis which we believe to be interesting and accurate insofar as costs per mile and per hour are concerned. Costs shown include all operating costs and depreciation.

201 - $1\frac{1}{2}$ ton 2-wheel drive dump trucks travelled a total of approximately 1,350,000 miles at an average cost of approximately 4.8¢ per mile. Rentals earned by the trucks totaled 183,000 hours at 30¢ per hour, whereas our records show the actual cost including depreciation would be 35¢ per hour.

Pickup costs averaged approximately 3¢ a mile, 30¢ per hour. Our rental rate is only 20¢ per hour.

Station wagon costs averaged approximately 5¢ per mile, 35¢ per hour. Our rental rate is only 30¢ per hour.

Pneumatic-tired motor patrols costs averaged approximately 26¢ per mile, 49¢ per hour. These unit costs will increase as winter overhaul work progresses. In most instances, repairs on these units were made prior to July 1st and expenses are not included in this calendar year's operating costs.

Fundamentally we are dependent on the operators of equipment for the accuracy of all cost records. These records will not be correct unless Operator's Daily Records are accurately and completely prepared. Complete information must be given in these reports. The breakdown of hours used on various authorizations must be exact as possible in order that the cost of maintenance on various sections be correct. These slips are checked at Division headquarters and a great deal of responsibility also rests with those entrusted with the checking.

The system is at present still in its infancy and there are many desirable changes, however, we believe we are accomplishing our purpose and through the splendid cooperation we have received from all concerned we are developing an accurate and valuable set of records. The continued interest, patience and assistance of all field forces will be appreciated.

TESTING TEETH AND BLADES

by

C. A. Decker, Assistant Materials Engineer

This spring the mechanical division purchased through the State Purchasing Agent 115,400 pounds of cutting edges and 8,396 pounds of scarifier teeth. Probably few employees realize that bidders for each year's needs are required to submit representative samples of both teeth and blades, and that each specimen is tested for resistance to abrasive wear.

The department for many years required that steel manufacturers guarantee a Brinell hardness on blades and teeth, or made a hardness determination with equipment available at the State College. The Brinell hardness is an abstract number obtained from measurements of the indentation made on the test specimen by a 10 mm. diameter steel ball under a 3,000 pound load. The higher the hardness index the harder, but not necessarily the tougher, is the material.

In 1928 the laboratory determined to supplement and perhaps supplant the Brinell test with some sort of an abrasion test as a measure of toughness. The first abrasion machine was developed and assembled in the mechanical shops of the college at Bozeman. The machine as assembled for the first series of tests was merely a shop grindstone equipped with a constant water delivery, a revolution counter and a clamp for applying a six inch section of blade or tooth to the wheel under constant load conditions. Through weighing, timing and recording of revolutions it was possible to determine the loss in weight per foot of blade or tooth per mile of abrasion. The abrasion attack of this test, while not comparable to actual service abrasion, can be readily duplicated as many times as necessary and is actually a measure of abrasive resistance of the specimen. In general, the Brinell hardness factor and the abrasion resistance factor of tests on this machine were in reasonable accord.

In 1935 a new machine was designed and built in the Helena shop. This new abrasive unit follows the general design of the original with many improvements and refinements. The abrasive wheel is a 48" x 6" medium grit grindstone mounted in a welded steel frame and powered with a 3-horsepower motor through a reduction gear box which turns the stone at a constant speed of 45 R.P.M. A constant water feed, well designed specimen clamp and a carborundum dressing arrangement on a permanent slide mounting provide additional aids to uniform testing conditions. Experimental runs showed that due to the development of a glaze on the stone, very little abrasion took place after the first four or five hours of test. The test has therefore been limited to a maximum duration of five hours or approximately thirty miles of abrasion. The stone is carefully dressed between tests.

Test results of a typical series of tests are tabulated on the following page.

Sample No.	Brinell Hardness	Grams Loss Per Foot of Blade Per Mile Abrasion	Percentage of Greatest Abrasion Loss
1	332	0.2406	100.00
2	444	0.0708	29.43
3	387	0.0922	38.32
4	364	0.1284	53.36
5	340	0.1140	47.38
6	364	0.0873	36.28
7	387	0.1060	44.06
8	340	0.1404	58.50
9	351	0.1124	46.72
10	351	0.0850	35.33
11	332	0.1946	80.88

This series shows a close correlation between the abrasion test as developed and the Brinell hardness number. Blade number 10 was purchased.

The blade or tooth showing the lowest wear or the highest Brinell number is not necessarily recommended for purchase as the unit price bid and the abrasion loss are taken into consideration in determining the best buy.

The many variables present in maintenance and reconstruction make prediction of actual service life on the basis of tests impossible, but the test does definitely select the specimen from a group which will offer the greatest abrasion resistance.

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Division 1 -- the next issue of this sterling publication is yours to do with what you may. Keep it in mind, and let's see something new, different, and novel for the July number.

And you other divisions, you'll be coming up soon, so give it a thought now and then.

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Curves & Angles

Since he joined the local Whisker Club, Frank Cunningham, a very dependable contributor, has neglected his work. It has been rumored that "Poncho" will be asked to submit his resignation at the next staff meeting.

For the Headquarter's Number several of the female attaches have voiced their opinions as to the part they play in the program "Better Highways in Montana". First, we have a poem written by Eve Kraft who has previously proved her ability to write verse.

How do you do, Bud, Joe, Hack and Bob
I'm not the new girl, but I've got a new job
What am I doing, oh don't you know
I'm filing maps and letters where they won't show
But boy I can find them I hope right a way
Don't believe me? Then visit our Planning Survey.

* * * * *

The other day one of the Center Line's stalking reporters came stealthily into the "Blue Room" and nonchalantly said, "Write something about your job for the Center Line and have it in by Saturday." I was caught very much unawares and could think up no better excuse than to answer weakly that "I couldn't write, wouldn't write, and please, that I didn't want to write anything." Said reporter cast me one withering glance that conveyed the idea "you write, or else", so here is my very feeble attempt - and believe me, it is feeble - to try and give a bit of information about what goes on here.

I have been called "watchdog" more than once. The idea being that anyone coming in to see the Chief, first comes into the Reception Room where he gives his name, address and nature of business. Then he waits his turn to get into the inner sanctuums. Sometimes, quite a crowd will gather, especially during the time of a Commission meeting when various delegations from over the State come to appear before the Commission. Once there was a delegation of about 75. That day you could hardly get through the north wing without a front and rear guard. But all this is what makes this job so interesting -- meeting just about every type and kind of human being, from rabid labor leaders to stately, awe-inspiring judges.

There are other duties too -- taking and transcribing dictation, filing, helping other departments with rush work and other minor duties that any law-abiding stenographer is familiar with.

And last but not least, I'm the gal who picks your pockets just about once or twice a month for the sake of "Sweet Charity" in one form or another.

* * * * *

No softball this summer? What happened? George Core has been transferred to Great Falls, Bill Ashton, a noticeable member of the Whisker Club is busy, and promoting the sale of Coco Cola takes up most of the time of Harry Fuller who umpired most of the games last season. Golf is now Richard Flaherty's favorite sport, while Dale Lince enjoys his tennis. Since he's been working on the Helena-Glancy job, Charlie Shelton has time for nothing more than work. Guess the boys are too busy.

Dale Lince does not know it, but there is another typist in the Miles City office who is not shown on the payroll records. After using two digits in an amusing manner of "What thou seekest, thou shall find", Shields Brewer down there, decided that through constant effort one can achieve new skill. During the past winter months, he toiled many hours, an ardent student, and now uses eight digits and one thumb in a rhythmic stroking of the typewriter. Without the ten commandments to inspire him, I doubt that "Slim" would have accomplished his great feat.

"Thou shalt have no other thoughts before thee.

Thou shalt not make unto thee any engraving, or any likeness of any character that is in the row above, or that is in the row beneath, or that is in the bar under the row. Remember the practice period and keep it wholly. Six days shalt thou labor and do all thy practice work. Thou shalt Arch, Snap, Recoil, all days of thy typing that thy lessons may be short in the errors which thy hesitation bringeth thee. Thou shalt not kill time. Thou shalt not commit erasure. Thou shalt not steal strikeouts. Thou shalt not bear false testimony regarding thy progress. Thou shalt acquire technique, rhythm and accuracy.

* * * * *

The outline of endeavor and the part I play
in the Montana Highway Planning Survey by
Kathryn McLean

It's very confusing I must admit
To explain to you just how I fit
In our particular world of strive and strife
To make a success of life.

I'm not one, I always say
To complain from day to day
About my troubles
Yet, I mustn't pretend that I am not chagrined
About that buzzer's din.

From morn til night
It is a fright
How that thing can always bring
Me back to life.

It's, "Where's that file
on the Vehicle Mile",
or "Take a letter
for good or better."
And yet again, "Is Bud in".

A million things to spoil my day
And make me walk my life away.

But after all 's said and done
The buzzer and ring
In my office routine
Is the very best thing.

* * * * *

Ann Lynch recently returned from California where she spent her vacation. We are glad to have Ruth Skinner and Verna Danforth back after a sojourn in Minnesota. After a brief leave of absence, Madeline Thomas is in Missoula working in the Division office. Pauline Thompson returned to Helena when the Bureau office was re-established, Mr. J. F. English taking Mr. E. D. Kinney's place. Another former employee, Jane Bell Gough, is working in the Right-of-Way Division during the rush.

* * * * *

The Duties of a Right-of-Way Stenographer
by
Fernetta Rice

The Engineering Division prepares descriptions covering the right-of-way necessary for the project involved. The Stenographer types the descriptions on the option and deed, and the options are turned over to the Right-of-Way Agent who does his "darndest" to get the landowner's "John Henry" on it.

When the Right-of-Way Agent returns from the field, he prepares a report on his negotiations with landowners. We prepare copies of this report for distribution to the Plans Division, Bridge Division, Office Engineer and Division Engineer.

If the field-agent has been unable to contact the landowner the right-of-way is secured by correspondence. In this procedure it is necessary to secure option, fencing claim, land and damage claim, joint fencing agreement, grant of possession, release of damage, partial releases of mortgage, etc., depending, of course, on the case involved.

In the cases where the field-agent is unable to settle with the landowner because of the exorbitant amount demanded, we exercise our right of eminent domain and condemn the land for public use. Final offer is made to the landowner, and the matter is turned over to the Right-of-Way Attorney. The stenographer prepares the necessary legal papers and letters. All special legal matters of the Patrol, Maintenance, Bridge Division and of the Highway Department, such as the Highway Debenture Test Suit, debenture procedure, and legislative matters, are dictated to her.

After receiving completed options and claims from the landowners and after the project is let for construction, the stenographer prepares deeds and checks the claims. (There are certain deed forms you follow for banking corporations, counties, cities, heirs at law, power-of-attorney, State land, Indian land, etc.) The files are carefully checked to be sure that all partial releases of mortgage, are secured, special considerations are inserted in the deeds, if fencing is involved a paragraph in regard

thoreto is inserted etc. The claims are sent to the Accounting Division, and the following week deeds and warrants are mailed out to the various banks throughout the State, and in some cases to the owners direct, for execution by the owners and delivery of warrants.

When the deed is received we breathe a sigh of relief because at last we know everything is clear sailing. In between times you never know what will happen to upset this brave crusade for better roads.

* * * * *

During the past few weeks twenty new names have been added to the road report mailing list. This summer approximately 800 reports will be sent out weekly telling the prospective tourist about Montana's highways.

Several Division Clerks, namely A. W. Hanson who toils in the Kalispell area, Gerald Lester, right hand man for S. B. Sanders, and Frank Cornell, another one of Curly Leary's stooges made opportune trips to Helena last month.

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* * * * *

GUESS WHO
by
Frances Durfee

"Road Use", "Motor Vehicle" and "Financial" Surveys
Make up the hours of my working days.

You can see me on any day of the week
Spacing a table or typing a sheet.

The object is to do as much as you can
In the limited time set by man.

You have the essentials of my versatile labor
And now for a short sketch on my associate's behavior.

Critics are found any old day
But the most noted of all in the Planning Survey.

They consistently take the fruits of my toil
And all my artistic tabulations do spoil.

Even so it is fascinating you know
And I wouldn't have it otherwise in spite of this show.

* * * * *

Last month we had a few reminiscents of former employees. Here is a bit of news concerning four more previous attaches of the Highway Department.

Marjorie Billings was a stenographer in the Accounting Division from December 1928 to May, 1929. After spending several years studying voice and piano in Chicago, Marjorie is back in the west in Seattle, working at the Pacific National Bank.

Another Accounting Division stenographer, Lillian Seiler, worked for about a year entering the State's employ in June 1931 and decided she was more interested in matrimony. Mr. and Mrs. Leo Gloniger now live in Havre and have two children, a son and daughter.

Maybelle Redding started to work in the Right-of-Way Division in September 1929 and for over five years was the sole stenographer handling deeds, titles, etc. When her family decided to move to the east, she resigned and went back to Grand Rapids, Michigan in June, 1935. Jane Boll Gough filled the vacancy. Last summer Maybelle renewed old acquaintances in Helena.

After working in the Great Falls office as Division Clerk for five years, Viola Fonger was transferred to Helena and was the Maintenance Clerk. Norman Hatch of the Butte office took Viola's place when she resigned in November 1933. Mr. and Mrs. Joe Daly are residing in Great Falls and have two sons.

In conjunction with the regular column next month, we expect a lengthy contribution from Rose Thomas for the Division No. 1 issue of the Center Line.

* * * * *

FLASH

You all recall that good old tune, "Smoke Gets in Your Eyes". It happens that while strolling along in the park in Rochester, Minnesota, Verna Danforth, your regular Curves & Angles editor, ran into a new acquaintance. The story changes the tune to "I've got dust in my eyes".

.....

LET'S FLASH AGAIN

Mr. and Mrs. Eugene Rogers of the Miles City division have reported that Old Man Stork brought a 9-3/4 lb. baby girl to their home May 25th. Mother and daughter are convalescing nicely and "Paw" is expected to return to normalcy soon.

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RIP-RAP AND HOW TO RIP-RAP

by
John Berres

Rip-rap and how to rip-rap. This was the subject discussed among other items taken from the book of general specifications at a recent meeting of project engineers and instrumentmen of this division.

To begin with, an attempt was made to arrive at a satisfactory definition of rip-rap rock; whether to define that rock by definite dimensional figures or by volume and weight. Opinions were more or less evenly divided in this. It was brought out that in either case the quality of stone would have a bearing on the feasibility of sticking strictly to dimensions or weight.

Available local supply of rock has much to do with the size and form to be used. It is presumed that with little exception rip-rap can be found adjacent to the project under construction or within a few miles and of such quality as to allow the use of given dimensions rather than weight. It was generally conceded that a stone of say six by twelve by eighteen inches would be good material. The exceptions would be in localities of glacial formation wherein rock of round or the so-called "nigger head" type can be found.

Rip-rap of these dimensions would as a rule be of sufficient weight to hold in place and yet be sufficiently light to be handled by one man or two when being put in place. There might be instances where sand stone formation or scoria would make it desirable to use larger sizes in order to obtain weight. True scoria is heavy and known in some places as 'iron rock', but in many cases that baked gumbo, appearing as a brick-like substance, is mistaken for true scoria. It has neither the weight or the weathering qualities desired for good rip-rap.

Summing up and boiling it all down it is to give the contractor and the laborer placing the rock a guide as to what is wanted. At all times means of measuring can be at hand, but to specify by weight is doubtful. The ability of some to judge weight is as short coming as was the fellow's in distance when he used to call that stuff 'near beer'.

The various railway companies throughout the state are pioneers in this subject of rip-rap and its placing. They have had much experience in its forms and formations. Having quarries of their own, it is always possible for them to use granite like rock and to break it down to desired size. This, of course, the state cannot enjoy. However, the railways and the highways have one thing in common and that is, the forces of water in flood stage, either in continuous quantities such as spring run-off or in flash floods or cloud bursts more commonly found in the eastern part of the state. Having these things in common, it would be well to study more carefully the manner in which these pioneers have met their problems in rip-rap.

Too little consideration may at times have been given in how the rock is to be placed and over emphasis made as to its size. No doubt there have been unnecessary embankment and bridge end washouts as well as channel washing. Possibly, these could have been avoided had greater concern and watchfulness been given the work of rip-rapping at the time it was placed.

Specifications call for rip-rap to be tbed in at the bottom and the ends to certain depths. There is little likelihood that failures have been laid to this part of the job, but in every case the failure can be laid to the improper fitting, bedding and chinking of the rocks bearing the brunt of the flood.

Rip-rap is one of the most expensive units of highway construction. It is one the contractor has no relish for and one that invariably they will pass over as lightly as possible in order to make a dime on it. One can not be too critical in his inspection of the job and tests should be made by actually trying to remove rocks and chinks here and there in the face of the wall, and if this can be done then the work is worthless.

If there is any doubt in one's mind as to what constitutes a good job of placing, there can be found examples in any division; those are not only smooth and even but have withstood the forces of floods from time to time. To think that the man in the office can give the exact place and elevation for this rip-rap is erroneous and the responsibility must be placed directly upon the man in the field.

Again the subject of available labor comes up. It is here then that the man on the job must know; to know if the rip-rap being placed will meet the demands likely to be called upon it and not to merely pass the job off as the best that can be expected from the local labor at hand. A good job of rip-rapping is as important an item in its requirements as a good job of finishing or structural work. As such, as much consideration should be given to finding a foreman sufficiently versed in its application.

Unless this is done, it might lead the powers that be to wonder if it was the lack of knowledge or pure indifference, as they doff their rain-sodden derby to scratch and wonder if their maintenance budget will span the gap.

* * * * *

He walked into the basketball tournament and sat down on a seat beside a cute young thing.

"Whose game?" he asked.

The c.y.t. fluttered her lovely lashes. "I am," she murmured.

.....

One trouble with being virtuous is that you can't tell your friends about it afterwards.

.....

The girl who knows all the answers is usually found in the most questionable places.

.....

ADHESION OF ASPHALT TO AGGREGATES

By

Ray Gagle, Research Chemist
Thor Rivenes, Soils Chemist

Montana Highway Engineers have often expressed their desire for more information concerning the question "Why do certain bituminous mats stand up very well while others fail miserably?" This article will attempt to explain this question using as a basis laboratory observations of the past year.

A bituminous mix is composed of graded aggregate and an asphaltic product. Until quite recently, the bituminous material was immediately condemned if failure took place in a mat, but test results have shown that oil alone is not responsible. It is true that both components of a bituminous mix contribute to the adhesiveness necessary to produce a good mat, but the aggregate is the most important factor and as such will be considered first.

Most aggregate is composed of a variety of minerals, depending upon their derivation from the parent geological formation or from the admixture of formations, and the extent of decomposition. Since Montana embodies every type of geological exposures, it can be seen that Montana Highway Engineers have to deal with innumerable aggregate types.

While it is true that many physical and chemical factors enter into the composition of any aggregate, there are certain general influences which control the adhesion of asphalt to aggregates in the presence of water or water-vapor. Under ordinary road conditions, moisture plays the biggest part in the earliest deterioration of bituminous mixes as compared with other factors. With reference to the relationship of water and aggregates to bituminous material two terms in common use are hydrophobic and hydrophilic. Hydrophobic is applied to aggregates which have a greater affinity for bituminous material than for water, and hydrophilic to aggregates which will lose their oil films in their preference for water.

Test procedures indicate that the major causes of the hydrophobic and hydrophilic nature of aggregates are:

1. The presence of water soluble compounds and the degree of alkalinity inherent in the aggregate.
2. Mineral Composition.
3. Mechanical character of the mineral surface.

The extent of weathering is a determining factor in the type of water soluble compounds present, and these, in turn, determine the degree of alkalinity in the aggregate under moisture conditions. The water solubles are composed of positive ions, either metallic or non-metallic, and negative ions or radicals which influence the pH. pH is a numerical index for minute changes in the degree of acidity or alkalinity.

The beneficial water solubles contain positive metallic ions having two or more valence bonds, and are known as activators. Activators, such as Fe, Ca, Al, and Mg, have a greater affinity for mineral surfaces than water when one or more of their free bonds are chemically combined with

the resinous or acidic constituents of the asphalt. This forms a water-insoluble metal-organic compound on the interface between the oil and mineral surface, which resists stripping.

The detrimental water solubles contain non-metallic mono-valent positive ions such as Na, K, and Li, whose one bond combines with the resinous or acidic constituents of the asphalt to form water soluble organic compounds that have no adhesiveness for the mineral surface under moisture conditions.

It is possible to have poor adhesion in the presence of natural activators, due to the predominance of alkali-forming elements which increase the pH. Test results on pH, which are determined in our laboratory with the use of organic indicators which are very sensitive to minute changes in alkalinity, show a definite correlation between poor adhesion and a pH from 7.5 to 10, a value denoting definite alkalinity. Conversely, in the presence of suitable activators, with the pH near the neutral point 7, a very good adhesion between the asphalt and mineral surface is noted.

The above phenomena offers a clear explanation of the fact that samples taken from the same pit but from different levels of the pit, vary greatly in their suitability for bituminous mixes. Every pit has been subjected to leaching by ground water, and the water soluble compounds have been deposited in the different levels. If the zone of leaching was originally high in Na and K feldspars, test results on a sample would be poor, as the mineral surface of such aggregate generates Na and K hydroxides, increasing the pH value, and reacting with the organic constituents in the oil to form water soluble organic compounds. If, however, the zone of leaching contains mineral surfaces high in Ca, Fe, Al, and Mg, test results would be good, while the zone of deposition containing the detrimental alkali salts would yield aggregates that show poor test results. It is easily demonstrated in the laboratory that these chemical influences are important. It is possible by the introduction of activators and collectors (corresponds to the resins and acids of the asphalt) to make an extremely hydrophilic aggregate, completely hydrophobic.

The foregoing has been a discussion of the chemical factors which enter into the production of a good adhesive bond between the bituminous material and the surface of the aggregate. Mechanical adhesion depends upon the porosity of the mineral surface, the type of asphaltic material used, and the temperature at which the oil is applied. Before the best adhesion between the aggregate surface and the asphalt is possible, intimate contact is necessary. The porosity of a mineral surface depends upon a partial leaching process as in the case of the feldspars. The Na and K oxides are hydrolyzed and removed, leaving a silica-alumina skeleton into which a penetration asphalt will anchor itself. We say penetration asphalt because our observations show that it exhibits better adhesive properties than asphalts containing lighter hydrocarbon fractions. Temperature of application is important, because, if sufficiently high, it tends to eliminate refractory hydrates in the aggregate and volatilize the light hydrocarbons in the bituminous material.

Completely hydrophobic aggregates are rare and are not likely to be found to any great extent in our Montana field. Preliminary investigation shows that it is possible to determine the exact conditions which make an aggregate hydrophobic. This is desirable in order to determine the possibility of artificially duplicating these conditions, thus eliminating the detrimental effects of moisture on bituminous mats without materially increasing the cost.

SIDE SWIPES

BY PSYNUS

A few weeks ago the newspapers gave space to plans for a super-highway toll system. Chief Thomas MacDonald of the B.P.R. since 1919 recently made his report: Three north-south and three east-west roads built by 1945 would have an annual cost for construction, maintenance, and operation of over 184 million. At 1¢ per mile for passenger cars and 3.5¢ for trucks and busses they would not pay for themselves until 1975 by which time there would accumulate one billion dollars interest. What he did recommend was improving and integrating 26,700 miles of existing arterial roads gridding the U.S. thru (1) straightening dangerous curves, widening roads, lowering steep grades, (the States doing the work under B.P.R. supervision), (2) eliminating big city bottle-necks by high-speed depressed or elevated highways straight through cities; by-passing small towns, (3) acquiring all right-of-way needed with Federal funds to be paid back over a 50 year period.

In 1938 there were five million radio equipped autos in U.S. Authorities in 38 states have failed to find any accident directly attributable to these radios. Theory now is that they induce slower driving, break the monotony of extended or night driving, soothe motorists during traffic jams, silence backseat driving. This bit of information is from a 2 year Princeton Radio Research Project financed by the Rockefeller Foundation.

The new auto has an 80 inch wheel base, 40 inch tread, two cylinder air-cooled engine, high speed of 50 miles per hour, 50-60 miles to gallon of gas, four gallon fuel tank, two quart lube oil capacity, and sells for \$350 for the roomy 4 passenger sedan. This new Crosley auto sells for less than the American Bantam.

But the U.S. public does not buy these small cars except as a second-car or special-purpose car. For the 70% of U.S. families now earning less than \$2,000 per year, proper housing must cost less than \$4,000 per unit. When this cost is reduced we can expect home-ownership to be as common as auto ownership (maybe).

While speaking of income lets look at a report of the U.S. Office of Education on a national study of 1928 to 1935 graduates - 46,000 from 31 representative colleges:

95% were temporarily or permanently employed.

Nearly one third of the men and one fifth of the women took unsatisfactory jobs because no others were available. College men earned an average of \$1314 the first year, \$2,383 after 8 years. College women averaged \$1,092 the first year, \$1,606 the eighth year. Best paid careers for men (\$2500 or more after 8 years) were dentistry, medicine, law, public office, architecture, insurance, research, forestry, business, telephone work. Poorest paid (under \$2000 average) were journalism, the ministry, clerical work. 17% (the biggest group) went into teaching. Best paid occupations for women were nursing and teaching.

Big college grads were better paid than those of small colleges.

Of the whole group, less than half the men and about one third of the women were married. Of the 1928 group 25% of the men were still bachelors, half the women still bachelor-girls.

And while we are on the subject of education let us look at this poem of Wallace Stevens:

Disillusionment of Ten O'Clock

The houses are haunted
By white nightgowns.
None are green,
Or purple with green rings,
Or green with yellow rings,
Or yellow with blue rings.
None of them are strange,
With socks of lace
And beaded cointures.
People are not going
To dream of baboons and periwinkles.
Only, here and there, an old sailor,
Drunk and asleep in his boots,
Catches tigers
In red weather.

The above poem was used as part of a Test of Thinking, devised by Professor Tyler of Chicago University, and tried on 1407 high-standing highschool students. 75% of them believed it was an argument for temperance. On other questions; 70% believed that daughters resemble their fathers more than their mothers, 60% that if a dominant man marries a weak woman more than half of their children will be boys.

Frequent mistakes in grammar made by press and college graduates: "Ionly have two." - "You will do as I say." - "What are his politics?" - "She goes from worst to worst." - "He's better than any man in the world." - "In re" is a show-off term. The vulgar arrest attention with "say", the more vulgar with "listen", the most vulgar with "Lookit". From Professor Opdycke's 859 page "Don't Say It".

If disillusionment of Ten O'Clock was not to your liking - how about this Oxford metaphysical classic:

There was a young man who said "Damn!
I have recently learned that I am
But a creature that moves
In predestinate grooves.
I'm not even a bus. I'm a tram."

Commencement started at Harvard as a celebration beginning the school year. Caps and gowns became academic garb when they were prescribed for medieval scholars to cover their rags. Caps and gowns became fashionable in U.S. after the Civil war and are worn daily at

Oxford and Fordham. Exhibitionist costumes at commencement reunions originated at Yale. At Harvard's 1938 commencement some alumni marched in barrels as economic royalists.

Crown Prince Akihito, now five years old, has his own palace. Twenty young sons of peers come to play with him in shifts on Wednesdays and Saturdays. Lately four more noble playmates with special talents were chosen to match Akihito's varying moods: Yasuo Nishi, 7, accomplished pilot of baby autos, Yoshitsuka Torio, 7, very good at drawing, Takatoshi Kinoshita, 6, a singer and athlete, and Tsuyo Mishima, 7, brilliant toy soldier tactician.

Instructions issued by the U.S. State Department to U.S. citizens who might meet the King and Queen of England:

Men: Bow when six feet away, low from the hips, hands at sides. Move three feet forward, watching King closely. If he extends his hand, bow again before grasping it. Wait for him to speak. Don't make a personal answer or ask questions. Before withdrawing, bow again. Retreat backward (having surveyed course for chairs, wheel barrows or other obstacles) and bow again before leaving the room.
Women: May curtsy, putting left foot behind right.

"Whilst the inhabitants of Europe are distracted by the din of arms, and their principal employment is to contrive the most expeditious means of destroying one another, let the happy citizens of those infant States turn their attention to the useful and elegant arts of peace..." From "One Thousand Valuable Secrets, in the Elegant and Useful Arts" published in 1795.

And speaking of elegant arts - Mrs. Edna Woolman Chase, editor of Vogue, addressing members of the Shoe Guild, "I want to plead with you to stop this promotion of the open-toed, open-backed shoe for street wear... Today you see millions of women, all over America, slop-slopping along the streets with not only their toes out,

but their heels out too...I won't be a bit surprised if, some day, they just walk right out on you and shellac their soles and put bolts on their toes and say, "To Hell with shoes!"....All this makes me very sad.

Beard culture being at its peak in Helena and Butte, etc. many notions about hair growth have been discussed. Careful laboratory experimentation has shown that:

Exposure to sunlight does not raise a crop of superfluous hair.
Shaving does not cause hair to grow out thicker and more bristly. (the illusion of stubble is caused by the changed ration of the hair's diameter to its length.)
Singeing does not seal the hair and prevent escape of its "vital fluid".
Hair is not a hollow tube full of sap.
Moisture is not harmful to hair, nor does the scalp "breathe".
The human scalp cannot be cultivated like a tract of arable land.
Like fingernails, hair is simply another form of the horny layer of the skin itself.
There is no case on record of hair turning white overnight from shock or fright.

Thirty-eight patients were stripped, placed on beds, and piled high with crushed ice, like frozen fish. An electric fan blew chill winds thru the cold room, and soon, the first numbing pain of the ice having been obliterated by anesthetics, they fell into a frozen slumber. For five days they remained in a coma, their pulse-beats almost stopped, their stomachs, kidneys and bowels ceased functioning, their general body temperature fell from normal 98.6°F to 90°F, a record sustained low. Only sign of life was the silent easy rhythm of their beating hearts. Thus did Doctor Temple Fay of Temple University temporarily retard the spread and growth of cancer in his experiment. Strangely enough, although human cancer cells cooled to 90°F stop growing, sometimes die, laboratory cultures of cancer cells, when frozen to 100° below zero multiply rapidly when warmed up.

The Mailomat is about the size of a telephone booth. You put your money in one slot, your letter in another, push a lever and the letter is automatically stamped and posted.

Speed and sanitation are the advantages. This is the latest Pitney and Bowes invention. They invented the well known Postage Meters.

The Plumbing and Heating Industries Bureau of Chicago describe a boon to bathroom tenors: Shower curtains inscribed with words and music or popular songs.

Last week Anthony Kosey came into his home saying, "Mother, It's Tony and I've brought your coal oil." His mother had sent him to the grocery store on his errand thirty-one years ago.

Extracted bits from a Valparaiso, Ind. relief investigators report, "Man with ulcer on his stomach ... Couple breaking up home, friends helping ... Man has diabetes and is insulated twice a day ... Man recently had operation, but is able to hold any position he assumes. Man hit by automobile - speaks broken English."

Ringling Bros. & Barnum & Bailey Combined Shows recently installed the first air-conditioned tent in circus history. Eight trailer units pump ice-chilled air into the tent on hot days and warmed air on cold days.

The Unknown Mother

"I've got a mother - I had to have,
And I love her - whether she's good
or bad,
Whether she's living or whether she's
dead,
Whether a saint or an old dope-head."

(Mother's Day poem by Texas Governor
W. Lee O'Daniel.)

"A Stradivarius violin, when played slowly, is not superior in tone to the best modern instruments, but responds more quickly when difficult rapid passages are played - a result probably of aging, not of the makers' skill", announced Acoustical Physicist Saunders and Virtuoso Heifetz at the completion of recent tests.

ROYALTY

Last Chance Gulch did her stuff for royalty Monday, May 29th, when the Crown Prince and Princess of Norway visited the Capitol City.

Arriving at 10:35 a.m. from the west via the Northern Pacific Railway the royal party was met at the depot by a welcoming delegation headed by Governor and Mrs. Roy Ayers. National Guardsmen formed a guard of honor to waiting autos that conveyed the visitors and their hosts to the Placer Hotel with an escort of motorcycle Highway Patrolmen.

As the cavalcade swung into Last Chance Gulch at the Steamboat Block it was joined by an added escort of colorful cowboys and cowgirls carrying American and Norwegian flags.

The entire seventh floor of the Placer Hotel was reserved for the Norwegians and more National Guardsmen were stationed in corridors and stairways to intercept unwelcome gate crashers.

At 11:45 the party was again escorted by Patrolmen and the cowboy and cowgirl contingent to a specially built and decorated reviewing stand where they watched the Annual Helena High School Vigilant Parade. The high school students outdid themselves this year in their presentation of the historic pageantry of the West. Prince Olav and Princess Martha were surprised and delighted with the picturesque demonstration.

Following the parade the visitors were taken for a short drive around the city from which they returned to attend a luncheon at the Civic Center. Here they were presented with complete sets of custom made Western regalia purchased with state-wide subscriptions by Montana residents of Scandinavian descent. The outfits included silver mounted stock saddles and bridles, boots, chaps, shirts and ten gallon hats.

After luncheon the Prince and Princess made an appearance on the stage of the Civic Center auditorium and briefly addressed the school children. They were then taken for an inspection of the gold dredge now working within the Helena city limits and to other nearby points of interest. They left via train for Yellowstone Park in the late afternoon after assuring their hosts and hostesses that it had been the most enjoyable day of their trip.

Prince Olav and Princess Martha are charming, unaffected, democratic people. Helena was proud to receive them for the State of Montana.

SKOL!

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Some people drink to forget; then they forget to stop drinking.

.....

PLASTIC MATERIALS FROM SAWDUST

by
John R. Bower, Jr.

(John R. Bower, Jr., whose article follows, graduated from the Helena High School in 1933 and from Montana State with a Ch. E. degree in 1937. At both of these institutions John won high scholastic ratings and upon his graduation from Bozeman was awarded a fellowship at the University of Idaho granted by Potlatch Forest, Inc. of Idaho. He then came to work for the Testing Laboratory in Helena, soon learning that so promising had been his work at the University of Idaho that he was again chosen for the Potlatch fellowship. At the University of Idaho John has been engaged in Wood Conversion Research, which includes more than carving a plank of Ponderosa Pine into a Charlie McCarthy, as the following article indicates. Just to show you that John is lucky (or maybe unlucky) as well as brilliant, his name was drawn at a bank night last week. He was unable to collect the \$200 take however, as he is still engaged in the above activities.)

Can particles of sawdust be reunited to give a smooth, hard, continuous mass with properties in any way as desirable as the original unbroken wood?

This question, which the writer shall try to answer in the following paragraphs, is offered to the reader at this point with a double purpose. First, frankly, to try to arouse curiosity as to what the succeeding paragraphs will contain; second, to give warning as to what will follow, and to furnish those less interested a convenient stopping place.

The aim of this article is to give a brief discussion of the field of wood plastics, and in particular the work being done in the field at the Wood Conversion Laboratory of the University of Idaho. This laboratory, where the writer is located, is the only one of its kind west of the Mississippi, and has attained its present prominence in the field of wood utilization largely through the efforts of Dr. E. C. Jahn, Professor in charge of the division until July 1938. Research fellowships at the institution have been financed by the Technical Association of the Pulp and Paper Industry and by Potlatch Forests Inc. of Lewiston, Idaho, but the results obtained are open to any industrial organization.

Why should anyone be interested in answering such a question as that propounded in the introductory paragraph? The explanation of this is undoubtedly the first duty of the writer.

Anyone who has visited a sawmill has undoubtedly noticed the huge quantities of sawdust, shavings, slabs, trims, and edgings which have to be disposed of in some manner. The customary procedure in the past has been to burn most of these materials in a huge incinerator. It is true that today much of the mill waste is sold for fuel purposes, but at best this is a wasteful form of utilization. At the scene of logging operations huge piles of split logs, slashings, broken trees, and branches are burned.

In the ways mentioned nearly sixty percent of the timber cut in the northwest is wasted, or, getting closer to home, the aggregate loss in logging and milling of timber in western Montana and northern Idaho is

fifty-five million cubic feet of wood annually.

In the face of our dwindling forest reserves it is evident that utilization of part of the waste material to replace wood, as normally used in the natural state, should prove to be an important conservation measure for one of our greatest natural resources.

Wood consists essentially of three principal parts, cellulose, lignin, and pentosans, with small percentages of other substances. It is the first two parts, cellulose, and lignin, that are of main interest in the production of wood plastics.

The natural lignin in wood is considered to be a cementing and strengthening material for the tissues. The thought that these properties might be utilized for the preparation of plastics has led to considerable research resulting in preparation of thermoplastic lignin resins. The Forest Products Laboratory in Madison, Wisconsin has produced lignin plastics by hydrolyzing wood and making the resulting material in a hot press with the addition of 6 to 8 percent each of aniline and furfural.

The Masonite Corporation has developed a process for forming a molding composition from wood. The wood is subjected to high steam pressures and temperatures for short times, and the resulting mass is dried, ground and molded into thin sheets which may be hot pressed to black hard sheets.

The Wood Conversion Laboratory at the University of Idaho is investigating the problem of the coalescence and plasticization of sawmill wastes along three lines: (1) coalescing wood particles by surface adhesion, (2) plasticizing wood by reaction with the lignin constituent, and (3) making a homogeneous moldable material by gelatinizing the entire wood substance.

The coalescence of wood particles by surface adhesion gives a hard dense product formed under rather remarkable conditions. Under proper conditions of temperature, pressure, moisture, and other factors, without the use of any chemicals or binders, ground sawdust may be formed into hard dense products with a specific gravity of 1.35 to 1.40 and with a strength greater than that of the natural wood. First thought might lead to the conclusion that the natural resins present in the wood form a cementing material for the sawdust particles. However, this theory is easily refuted by the fact that harder, stronger, coalesced products result if the natural resins are removed from the wood before it is molded.

Plasticizing reactions with the lignin constituent of the wood offer an interesting field of investigation. It has been known for some time that lignin contains the necessary chemical groups to form resins with furfural and aniline, resulting in a thermoplastic product of the Bakelite type. Since commercial plastics, including Bakelite, usually contain large amounts of wood flour or other fillers, one mode of attack at Idaho has been to subject the lignin of the wood to treatment without first removing it from the cellulose and other constituents of the natural wood. This results in a plastic with its filler already present, and does away with the troublesome procedure of first isolating the lignin fraction and then remixing it with a filler before formation of the finished plastic. Studies have been carried on to find means of making the lignin more available for reaction, without the use of chemicals, by subjecting wood to varying temperature and pressure conditions. These experiments, still incomplete, have shown promise of success.

The third process for forming plastic materials from wood consists of gelatinizing the whole wood substance followed by proper molding and drying. Gelatinization is a difficult term to define as applied to wood, but it results in a condition in which the wood has a slimy gelatinous feel and appearance. It is probable that the finer structural elements on the surfaces of the fibers are loosened and tangled with one another. Gelatinization of wood may be brought about, in different degrees, by treatment with acids, bases, certain salts, and mechanical treatment.

Before molding gelatinized wood, all chemicals used in its preparation are removed from it by washing, and may be recovered for further use if desired. The moist gelatinized wood is then molded under pressure and dried. The drying may take place under pressure and heat, or merely at ordinary atmospheric conditions, without changing the strength properties of the finished product in any way, thus indicating that the strength comes entirely from internal forces acting during the drying period.

The dried material is remarkable in that it has double the strength of the original wood (white Pine) and many times its hardness. It will take a smooth satiny finish and is easily worked with tools. If desired, dyes may be added to the wet gelatinized wood to give a permanently colored product.

Gelatinized wood may be mixed with large proportions of sawdust and fibers to form light weight fiber boards. It may also be used to give a smooth hard surface to porous fiber boards.

As a direct result of the research performed at Idaho, at least two industrial concerns are today working on the further development of the products briefly described above. Perhaps, in the not too distant future, we may find piles of sawdust being transformed into smooth continuous sheets of structural material.

References:

E. C. Jahn, Research and Development in the Chemical Utilization of Waste Wood, J. For., 35:12, 1937

E. C. Jahn, Forest Utilization Research Needs for the Future of the Inland Empire, Northwest Science, VII:3, Sept. 1933

J.R. Bower, Jr., A Study of Factors Affecting the Formation and Properties of Molded Gelatinized Wood, M.S. Thesis, U. of I., 1939.

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Memoirs are the memories a woman should have kept to herself.

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By the time you can afford three stenographers, age limits you to one nurse.

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Sometimes people marry and are happy ever afterwards; and sometimes they don't marry and are a great deal happier.

RANDOM RIP RAP

Between the first of January and the fifteenth of May, 1939, the Montana Highway Commission awarded 37 contracts amounting to \$2,321,851.55.

Of this total, \$359,400 went for the grading of 34.100 miles of road; \$606,700 for the grading and surfacing of 43.999 miles of road. \$506,500 for the grading, surfacing and oiling of 29.866 miles; \$350,700 for the surfacing and oiling of 40.717 miles. The total for road work was \$1,823,300, covering the improvement of 148.679 miles.

\$78,600 went for the construction of 1,220 feet of treated timber bridges and \$362,100 for 2,184 feet of steel and concrete bridges, making a total of \$440,700 for bridge construction.

Adding \$57,800 for 6 roadside improvement jobs and the \$51.55 which some contractor put in for the profit he overoptimistically hoped to make, brings the grand total to \$2,321,851.55, as previously stated.

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TESTING LAB

S. D. Patterson, Chief Chemist of the Testing Laboratory, was called to Dillon where he attended the funerals of an aunt and uncle who died within a few days of each other. Only recently Si went to the same town to attend the funeral of his father.

N. J. Tibbetts, Laboratory Assistant at Helena, has been transferred to Twin Bridges for the summer where he is checking gravel on the Vigilante Trail Road.

W. A. Shields of the Lab, who was taken ill on February 10, is convalescing at his home. Bill had a mighty tough struggle but is showing marked improvement during the past several days.

Wm. J. Weber of Deer Lodge has been appointed Junior Stenographer in the Helena Testing Laboratory.

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Instrumentman Chas. Cheney of Division 9 complains that the Center Line carries so little information regarding personnel transfers that he can't keep track of all the men from whom he has borrowed money. Just in case other SI's feel the same way, Division 9 enlightens you about the following: FAP 229-C & E -- Nugent, Cheney, Harcharik, Farry, Blake, Angstman and Edwards (Schaaf has been transferred to Division 2). FAGH 115-F: Small, Robertson and McGuinn. FAGH 239-E -- Gibbs and Haskell. FAP 8-G: Cardozo, Rygg, Culver, Chandler and Best. (DeVore and Rusek have been transferred to Division 5). The above setup is not guaranteed, and will probably be all wrong before the ink has dried on this issue. Judging from the way SI's have been whizzing around that area for the past few days our Personnel Department must be as busy as the well-known cat.

Division 9 claims that one of these days (as soon as they've won a game) they're going to give us a write-up on their softball team. The Bozeman Oaks are reported to be considerably worried about this outfit, which boasts such stars as "Smoke Ball" Farry, McChes, Nugent, Cheney, Brown, Marvin, Benjamin, Angstrom, Harcharik, Keeney, etc. (Those not mentioned please excuse). Oh yes, also "Water & Bats" Jeanne Rogers.

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FLASH: WORLD'S RECORD FOR THE SITTING BROAD JUMP WAS BROKEN IN Lewistown on May 17th when Ray Percy failed to notice a bumblebee on the front seat of his new Chev. We're still wondering how the bee managed the necessary end-swapping under a load of some 270 pounds.

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On May 8th Phillip Brittain was transferred from the Billings division to the Bozeman division to take charge of the construction of FAS 370-B (1), Bridger Canyon feeder road. The remainder of the party consists of L. W. Cottrell, Leland R. Raymond and Jerry Kennedy.

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Through an agreement with the Bureau of Public Roads, Division Ten's Sno-Go snow plow began opening the Red Lodge-Cooke City highway on April 24th. Although the snow was packed very hard and ranged up to 14 feet in depth, the plow completed its assignment by May 20th.

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It was a sad day around the Bozeman Shop May 20th when they came and took the Division Engineer's Plymouth coupe away, (Ed: That's darn near poetry, Fred, but we can't seem to make any legitimate meter out of it) after it had given the Highway Department nearly three of the best year's of its life and had traveled 127,000 miles. It will be some little time before its replacement, a shiny new Chevrolet sedan with one of those new-fangled gear shifts (similar to the hand throttle on a model T) will gain the warm spot old #107 held in the collective heart of Div. 10.

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D. J. Healy, Statistical Clerk in the Bozeman office, was transferred to Wolf Point May 22nd to replace Geo. L. Hammons, Division Clerk, who had to leave because of ill health. Eddie J. Kuhne of the Plans Division replaced Mr. Healy.

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John Cornelius Leary put in an appearance at St. James Hospital in Butte on May 3rd. His trainers weighed him in at 7-1/2 lbs. bedside. On his arrival this youthful sprig of Shamrock looked in vain for his sire "Curly," the latter being at the K. C. Hall half way between a sweat and a swoon awaiting the flash. Curly immediately loped over to greet the midget lyre, or, lest we be misunderstood, the wee harp, and presented him with a new red throwing brick and a miniature shillalah.

God help the descendants of the Swedes who participated in The Battle of the Blin' Wether!!

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L. P. Giese, Laboratory Assistant of the Testing Lab, better known as the maestro of "Larry's Men of Swing," has been transferred for the summer to Roundup where he is checking gravel for C. T. Davis' crew. Larry's musical crew use "Lights Out" as their theme, but before leaving Helena the genial orchestra leader suggested that the boys substitute another while he was away. Yep, you've guessed it. "I'm Heading for the Last Roundup."

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The Testing Laboratory has opened its Branch Labs for the oiling season. G. C. "Eddie" Core is in charge at Great Falls, Chet M. Simpson at Billings, and M. K. McCormick at Laurel. Albert Holton has recently been assigned to the Branch at Billings to assist "Shanghai" Simpson at that point. A recent oil order placed with a company at Cody, Wyoming, necessitated the establishing of a Branch Lab there, and R. H. Gagle, Research Chemist has gone to the Wyoming city for the purpose.

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The Testing Laboratory claims the record among Helena departments for the largest percentage of workers who have complied with the local Jubilee Committee's request that all men wear whiskers for the occasion. Every employee of the division has facial foliage of some description.

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1939 PUBLICATIONS

As stated in last month's Center Line our 1939 tourist literature is now ready for distribution, with the exception of our new highway maps. Due to the fact that we are late in receiving these publications, we are very anxious to get the quickest distribution possible, and are asking the help of all employees.

This literature is of course intended for out-of-state distribution. On the following page we have prepared a handy form which we would like to have you tear out and list thereon any friends in other states whom you think would be interested in these publications. Drop it in your outgoing mail basket and the Traffic Division will see that copies are promptly mailed to the persons listed.

Incidentally, we are forwarding supplies of this material to each division so that all employees may have copies.

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Felix says, "A girl will have a lot more respect for the men who doesn't try to kiss her, but she'll invite someone else to the clambake."

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Rumba dancers generally start at the bottom.

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